
UC Santa Cruz IBSC Facility

Grant Award Details

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Grant Type: Major Facilities

Grant Number: FA1-00617

Investigator:

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Institution:	University of California, Santa Cruz
Type:	PI

Award Value: \$7,191,950

Status: Closed

Grant Application Details

Application Title: UC Santa Cruz IBSC Facility

Public Abstract:

We propose a 13,200 square foot research facility dedicated to basic and discovery research in stem cell biology on the top floor of a planned, state-funded biomedical research building. The facility is designed to house six stem cell faculty and to support all institute affiliates through the establishment of several core facilities, including cell culture, cell sorting, microscopy, electrophysiology, a sequencing center, and dedicated space in a new animal facility in the same building. Other institute affiliates will be located on other floors of the building or in buildings nearby.

The facility will house the Institute for the Biology of Stem Cells (IBSC), an interdisciplinary program currently involving 18 faculty from 5 departments and numerous collaborators from other institutions. The IBSC combines the unique strengths of a diverse group of researchers to address many of the most challenging problems in stem cell biology. Some of the projects IBSC faculty are undertaking include:

- o Developing computer programs and a database to analyze the wealth of data being generated in stem cell research labs throughout California, and making the data available on a public web browser
- o Studying the mechanisms by which DNA packaging, gene expression, and RNA processing are regulated to orchestrate the ability of stem cells to self-renew and to differentiate into the myriad cell types of the human body
- o Studying the molecular mechanisms by which neuronal stem cells generate specific types of neurons, and defining the conditions under which specific types of neurons can be reliably generated and maintained
- o Exploring the biology of hematopoietic stem cells and applying that knowledge to clinical applications
- o Revealing how the regulation of RNA is responsible for the development of muscle cells
- o Developing bone marrow stem cells that are resistant to the toxicity of certain cancer chemotherapies
- o Studying the behavior of neural stem cells transplanted into post-stroke brains and optimizing post-stroke motor training in a mouse model
- o Applying "adaptive optics" technology developed by astronomers for the Hubble telescope to imaging cells and structures deep within experimentally generated embryos to better understand early development
- o Using "lab-on-a-chip" technology to develop a stem cell environment capable of growing billions of stem cells per square centimeter, for large scale production of therapeutic stem cells

These studies have potential clinical applications for many conditions including myotonic dystrophy, ALS, spinal cord injuries, stroke, certain heart diseases and cancers, and others. This opportunity will more than double the NIH-free stem cell space available to the IBSC, allowing new faculty to be hired and co-located with necessary core facilities and other biomedical research labs. The proposed facility will greatly assist our recruitment efforts and ensure the continued growth and vitality of our stem cell research.

Statement of Benefit to California: The proposed facility for the Institute for the Biology of Stem Cells will enable new research that integrates the expertise of several strong research groups focusing on problems in stem cell biology, provide research space for new stem cell faculty hires, facilitate the collaborative work of many of our faculty with colleagues at other institutions, and add another node to the network of stem cell institutions in the state. At our institution, molecular, cell and developmental biologists will join forces with bioinformaticists, engineers, and even astronomers to perform basic and discovery research that will contribute to the foundation of knowledge that will serve as the underpinnings of important advances in stem cell-based medicine. The proposed facility will position IBSC faculty to make significant headway in several key areas of stem cell research, with a number of projects holding promise for eventual pre-clinical studies.

Specific benefits to the state of California for providing space for the IBSC include:

- 1) More projects entering preclinical studies
- 2) Recognition to the state of California for its role in advancing stem cell research, education and training at an institution with a strong track record in training minority graduate students
- 3) Attracting more stem cell scientists and companies to California
- 4) Development of new technologies to overcome problems associated with analyzing single cells, deep-tissue imaging, and growing large populations of stem cells for harvesting
- 5) Technology transfer from academia to the private sector
- 6) Quicker development of therapies
- 7) Development and characterization of stem cell lines that will populate an envisioned stem cell bank in California.

In addition, building the IBSC will enable a web-based database and browser with bioinformatics tools to analyze the wealth of data being generated in stem cell research labs throughout California, integrating the data and making it available to the public.

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